UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 90907

CR NO. 57

OVER THE

SOUTH BRANCH OF THE BUFFALO RIVER

DISTRICT 4 - CLAY COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 52)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 90907, the East and West Abutments and Pier 1, were found to be in mostly good to fair condition. Typically, the timber piles exhibited minor checks and cracks up to 1/8 inch wide; however, several of the timber piles were also hollow with up to 50 percent section loss. The channel bottom around the substructure units was well established and stable, with no evidence of significant scour and with no appreciable changes since the previous inspection, aside for some minor aggradation.

INSPECTION FINDINGS:

(A) The timber piles typically exhibited random minor checks and cracks up to 1/8 of an inch wide.

(B) The second timber pile from the downstream end of Pier 1 was hollow from one foot below to 2 feet above the waterline with an estimated 20 percent section loss.

(C) The downstream timber pile of Pier 1 was hollow from 1.5 feet below to 3 feet above the waterline with an estimated 50 percent section loss. Within the same area of the pile, the outer shell was soft with up to 1.5 inches of penetration.

(D) The second timber pile from the downstream end of the West Abutment was hollow from 2 feet below to 1 foot above the waterline with an estimated 50 percent section loss.

(E) The north end of the East Abutment pile cap was decayed with up to 1 inch of penetration.

(F) The diagonal timber bracing was missing from the two upstream timber piles of Pier 1.

RECOMMENDATIONS:

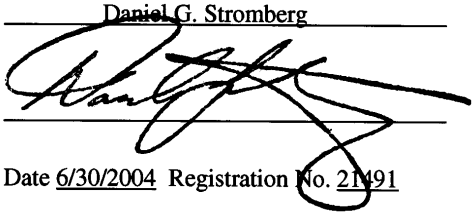
(A) Replace the missing lateral bracing on Pier 1 to re-establish the lateral stability of the structure.

(B) Monitor the timber piles that exhibited section loss during future inspections. A structural review should also be made to assess the need for replacement and/or helper piles at this time.

(C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

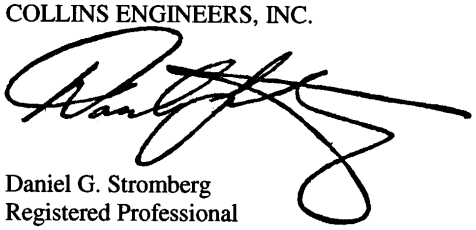
Daniel G. Stromberg



Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 90907

Feature Crossed: The South Branch of the Buffalo River

Feature Carried: CR No. 57

Location: District 4 - Clay County

Bridge Description: The bridge superstructure consists of a two span timber deck supported on multiple timber beams. The superstructure is supported by one timber pile pier and two timber pile abutments. No design drawings were provided.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: October 29, 2002

Weather Conditions: Rain/Snow, "35EF

Underwater Visibility: "1 foot

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Abutments, and Pier 1.

General Shape: Pier 1 consisted of a single row of timber piles supporting a timber cap beam. The pier is braced with diagonal cross-bracing timbers. The upstream pile has been replaced with two steel H-piles. The abutments are comprised of timber piles with attached timber planks which form a vertical retaining wall (backwall) and two wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 4 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the timber pile cap on the south end of the West Abutment.

Water Surface: The waterline was approximately 8.2 feet below reference.
Assumed Waterline Elevation = 91.8.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

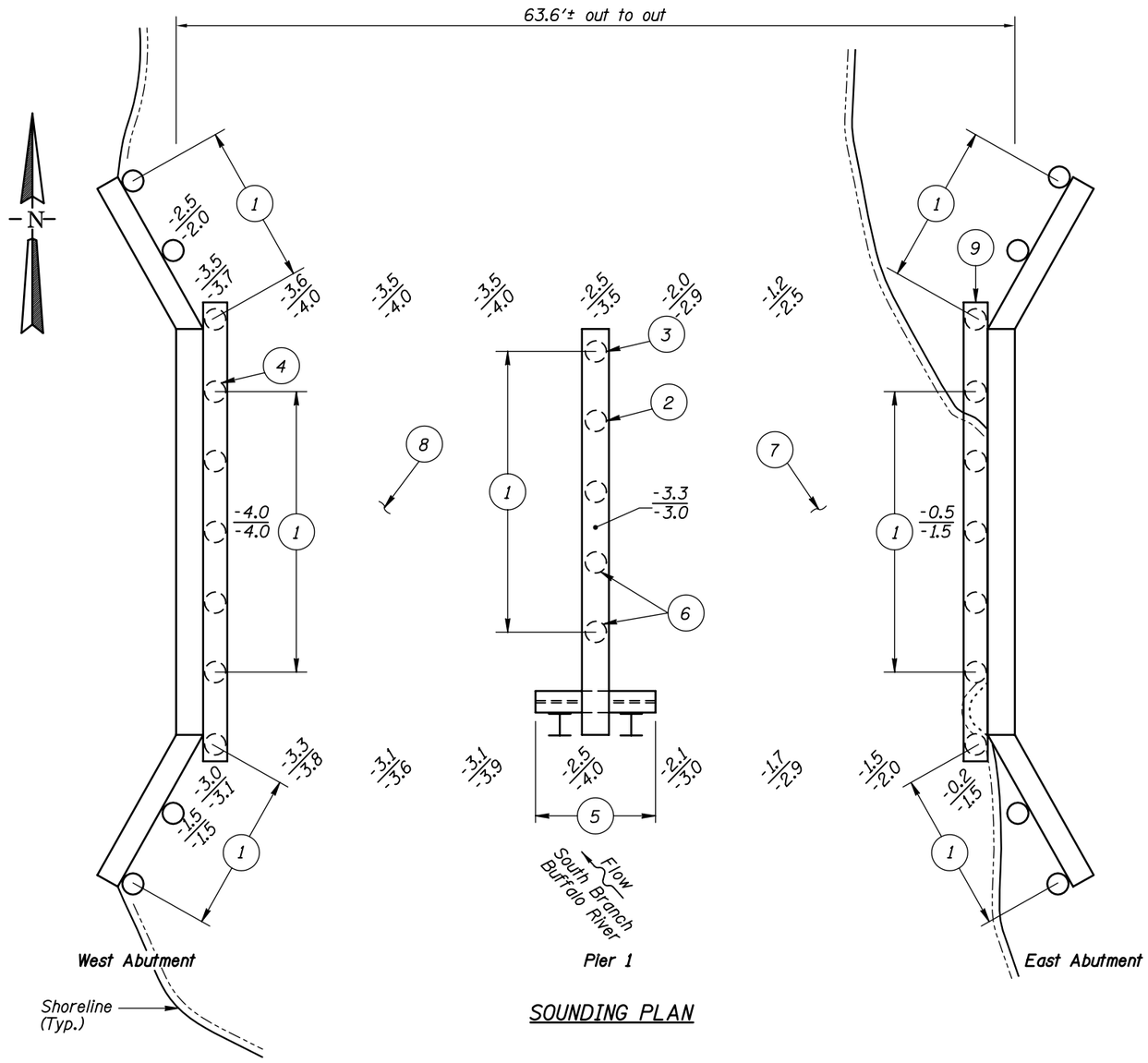
Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/10/02

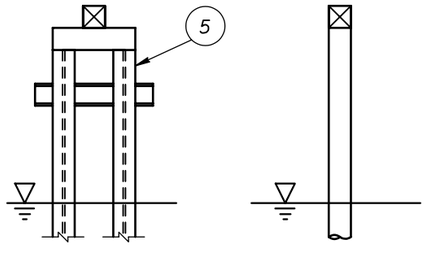
Item 113: Scour Critical Bridges: Code I/95

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____Yes ___X__ No



SOUNDING PLAN



END VIEWS OF PIER 1

GENERAL NOTES:

1. Pier 1 and the East and West Abutments were inspected underwater.
2. At the time of inspection on October 29, 2002, the waterline was located approximately 8.2 feet below the top of the timber pile cap at the upstream end of the West Abutment. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 91.8.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The timber piles typically exhibited random minor checks and cracks up to an 1/8 of an inch wide.

(2) The timber pile was hollow from one foot below to 2 feet above the waterline with 20 percent section loss.

(3) The timber pile was hollow from 1.5 feet below to 3 feet above the waterline with 50 percent section loss. In the same area of the pile, the outer shell was soft with up to 1.5 inches of penetration.

(4) The timber pile was hollow from 2 feet below to 1 foot above the waterline with 50 percent section loss.

(5) The two steel H-piles with a horizontal steel brace, which replaced the original upstream timber pile, exhibited light surface corrosion.

(6) The diagonal timber bracing was missing from the two upstream timber piles.

(7) The channel bottom consisted of soft silt with up to 1 foot of probe rod penetration.

(8) The channel bottom consisted of clay with 6 inches of probe rod penetration.

(9) The north end of the East Abutment pile cap was decayed with up to an inch of penetration.

Legend

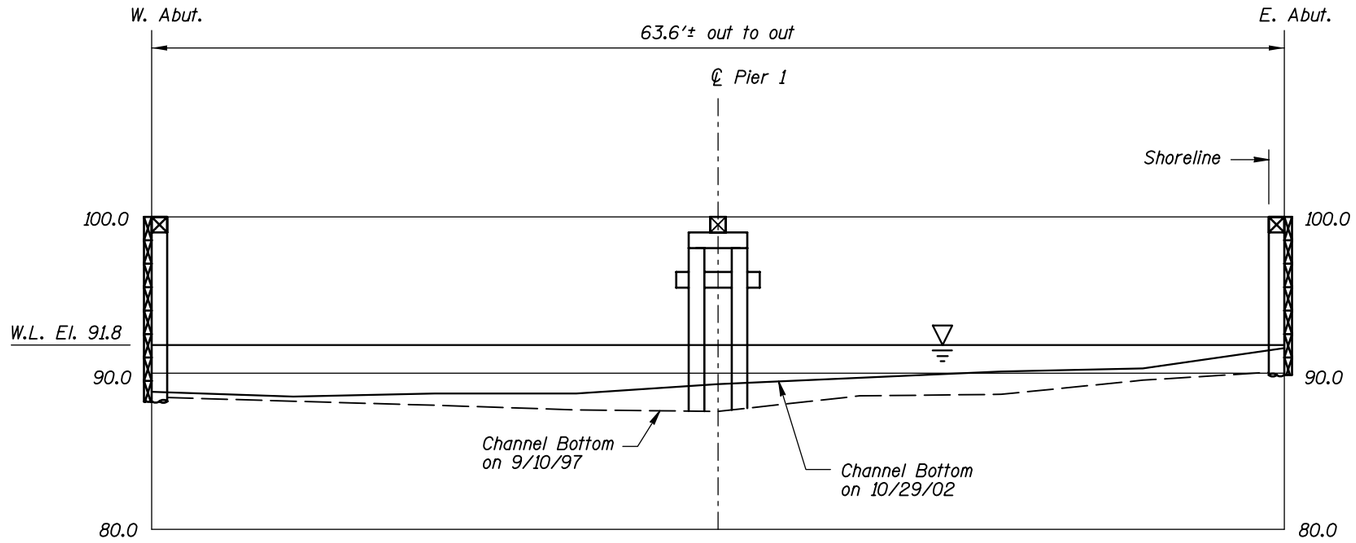
-2.0	Sounding Depth from Waterline (10/29/02)
-5.2	Sounding Depth from Waterline (9/10/97)
○	Timber Pile
◌	Timber Pile (under cap)
I	Steel H-Pile

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

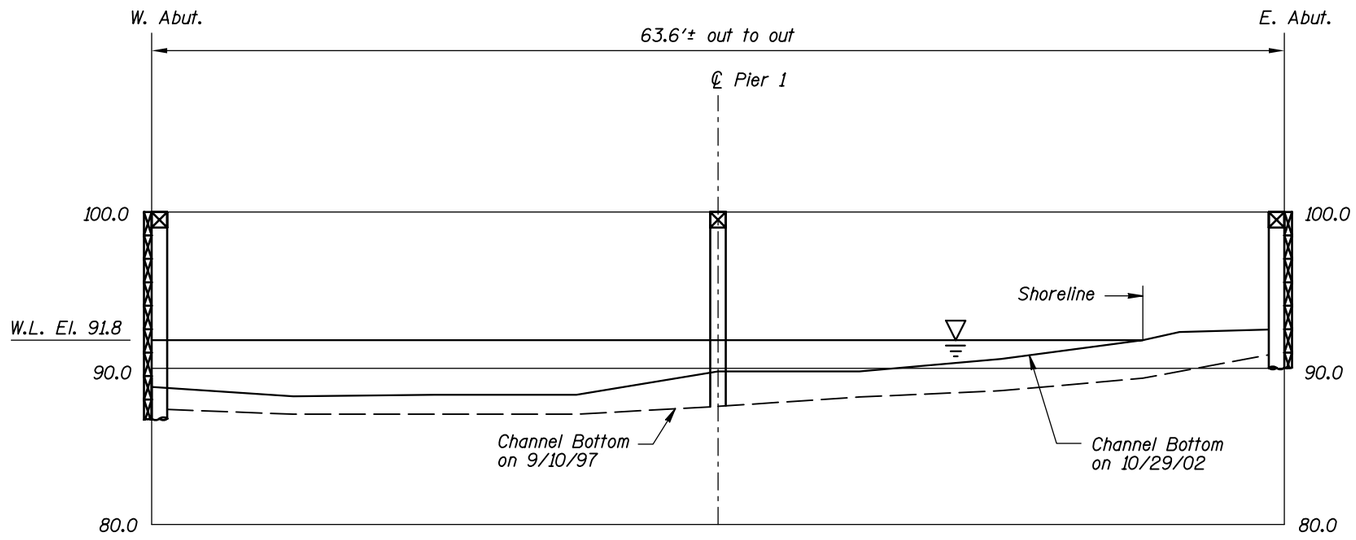
STRUCTURE NO. 90907
OVER THE SOUTH BRANCH OF THE BUFFALO RIVER
DISTRICT 4, CLAY COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120052		Figure No.: 1



UPSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"



DOWNSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 90907
OVER THE SOUTH BRANCH OF THE BUFFALO RIVER
DISTRICT 4, CLAY COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	**COLLINS ENGINEERS, INC.**	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS (U.O.N.)
Code: 35120052		Figure No.: 2

Photograph 1. Overall View of the Structure, Looking Northeast.

Photograph 2. View of East Abutment, Looking Northeast.

Photograph 3. View of Pier 1, Looking Southwest.

Photograph 4. View of West Abutment, Looking Northwest.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 29, 2002
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.
BRIDGE NO: 90907 WEATHER: Rain/Snow, "35EF
WATERWAY CROSSED: The South Branch of the Buffalo River
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER
PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins
EQUIPMENT: Scuba, Probe Rod, Lead Line, Sounding Pole, U/W Light, Scraper, Camera
TIME IN WATER: 9:40 a.m.
TIME OUT OF WATER: 9:55 a.m.
WATERWAY DATA: VELOCITY Negligible/None
VISIBILITY "1 feet
DEPTH 4 feet maximum the West Abutment
ELEMENTS INSPECTED: East and West Abutments, and Pier 1
REMARKS: Overall, the piles of Pier 1 and the two abutments were in mostly good to fair condition. The timber piles typically exhibited minor vertical checking or cracking; however, three of the timber piles were hollow and had up to 50 percent section loss. The steel H-piles, which replaced the upstream timber pile of Pier 1, exhibited light surface corrosion with no section loss observed. The diagonal timber braces were missing from the two upstream timber piles of Pier 1. The channel bottom at the bridge appeared stable with no notable deficiencies.

FURTHER ACTION NEEDED: ___X___ YES _____ NO

Replace the missing lateral bracing on Pier 1 to re-establish the lateral stability of the structure.

FURTHER ACTION (CONTINUED)

Monitor the timber piles that exhibited section loss during future inspections. A structural review should also be made to assess the need for replacement and/or helper piles at this time.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 90907
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The South Branch of the Buffalo River

INSPECTION DATE October 29, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	West Abutment	4.0’	6	7	N	8	N	6	8	7	7	N	7	N	N	6	7	N	N
	Pier 1	3.3’	5	N	N	8	5	5	8	N	N	N	8	N	7	5	7	7	N
	East Abutment	0.5’	7	7	N	8	N	7	8	7	7	N	7	N	N	7	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the piles of Pier 1 and the two abutments were in mostly good to fair condition. The timber piles typically exhibited minor vertical checking or cracking; however, three of the timber piles were hollow and had up to 50 percent section loss. The steel H-piles, which replaced the upstream timber pile of Pier 1, exhibited light surface corrosion with no section loss observed. The diagonal timber braces were missing from the two upstream timber piles of Pier 1. The channel bottom at the bridge appeared stable with no notable deficiencies.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.